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IS 10640 (2011): Soxhlet extractors [CHD 10: Glassware]

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सॉक्सलेट निष्कर्षक — विशिष्टि

(पहला पुनरीक्षण)

Indian Standard

SOXHLET EXTRACTORS — SPECIFICATION

(First Revision)

ICS 71.040.20

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

November 2011 **Price Group 3**

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Glass, Glassware and Laboratoryware Sectional Committee had been approved by the Chemical Division Council.

This standard was first published in 1983. The Committee responsible for the formulation of this standard decided to revise it. In this revision, requirements for Soxhlet extractors of 10 ml and 20 ml have been deleted and Soxhlet extractor of 50 ml capacity has been replaced by 60 ml capacity. Dimensions of length from bottom for body, siphon tube, vapour tube and lower appendage have been modified. Soxhlet extractor of Pattern B-1 has also been eliminated.

Soxhlet extractors provide a convenient, safe and economic means of solvent extraction of solids or semi-solids. By utilizing the Soxhlet system, extraction by inflammable, toxic or odoriferous solvents can be carried out conveniently over extended durations.

The test sample is placed in a thimble, filter paper or cloth bag. It is placed in the extraction chamber of the extractor. An appropriate solvent is vapourized in the evaporation flask. The vapours are passed through a vapour-lead-tube into the extraction chamber. They rise into the condensor and condense to the liquid state. The condensed solvent falls at the top of the thimble/bag and slowly fills the extraction chamber. As the level of the liquid reaches the top of the siphon, the liquid contents are siphoned back into the evaporating flask. Periodic siphoning is continued with little loss of the solvent. The extraction continues automatically and is self sustaining as long as the vapourization of the solvent continues. After a number of cycles, extraction would be completed. An appropriate analysis of the dissolved product in the solvent can then be made.

Performance of Soxhlet extractors is governed by factors, such as nature of solvent used, rate of its refluxing and the dimensions of the siphon tube. In case the solvent or the extract is very viscous, the temperature of the siphon tube may also become important. Careful attention is given in the selection of the right size of the siphon tube and the size of body of the extractor. Consideration is also given to standard sizes of flasks [*see* IS 1381 (Part 2) : 1977 ‘Boiling flasks: Part 2 Flasks with conical ground socket (*first revision*)’] and condensers [*see* IS 6052 : 1988 ‘Glass condensers (*first revision*)’] in selecting the proper sizes of cones and sockets required for assembly.

The composition of the Committee responsible for formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SOXHLET EXTRACTORS — SPECIFICATION

(First Revision)

1 SCOPE

This standard prescribes requirements and methods for sampling and test for Soxhlet extractors for general laboratory use.

2 REFERENCES

The standards listed below contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
1382 : 1981	Glossary of terms relating to glass and glassware (*first revision*)
2303 (Part 1/ Sec 1) : 1994	Grading glass for alkalinity: Part 1 Hydrolytic resistance, Section 1 Hydrolytic resistance of glass grains at 98°C — Method of test and classification (*first revision*)
4426 : 1992	Methods of sampling laboratory glassware (*first revision*)
5165 : 1969	Specification for interchangeable conical ground-glass joints
7374 : 1974	Specification for glass rods and tubing for laboratory glassware
9153 : 1978	Methods of polariscopic examination of glassware

3 TERMINOLOGY

3.1 For the purpose of this standard, the definitions given in IS 1382, and the following, shall apply.

3.1.1 *Nominal Capacity* — The nominal capacity of a Soxhlet extractor shall be the capacity of the body in cubic centimetre (cm^3) or millilitre (ml) when filled to the overflow level of the siphon tube.

4 NOMINAL CAPACITIES

Soxhlet extractors shall have the following nominal capacities: 60, 100, 200, 500, 1 000 and 2 000 ml.

5 DESIGNATION

Soxhlet extractors shall be designated by nominal capacity.

6 REQUIREMENTS

6.1 Patterns

Soxhlet extractors shall be of Pattern A and B as shown in Fig. 1 and 2.

6.2 Material

The extractors shall be made from colourless low expansion borosilicate glass tubing (*see* IS 7374), not having any pronounced tint.

6.2.1 *Limit of Alkalinity*

When graded according to the method prescribed in IS 2303 (Part 1/Sec 1), the glass used for extractors shall conform to Class HGB 1.

6.2.2 *Annealing*

The ring strain of the extractors shall be not greater than Temper No. 1 when tested in accordance with Method A of IS 9153. The longitudinal strain, if present, shall be faint and uniformly distributed.

6.3 Workmanship and Finish

6.3.1 The extractors shall be free from defects which detract from their appearance or impair their serviceability. They shall be free from cracks, chips, sharp edges, bubbles or gases inclusions. Except for the vapour and siphon tubes, they shall be symmetrical about the axis.

6.3.2 *Vapour and Siphon Tubes*

Vapour tube and siphon tube shall be on the same side.

6.3.2.1 The lower portion of the vapour tube shall slope downwards to ensure complete drainage.

6.3.2.2 The siphon tube shall be close to the body of the extractor. The entry of the tube into the body shall be located in such a position that it ensures maximum drainage of the extractor. The top portion shall have an enlargement just before it bends into a smooth loop. The lower portion of the siphon tube shall slope downwards to ensure complete drainage.

6.3.3 *Conical Ground-Glass Joints*

Conical ground-glass joints used for cones and sockets of extractors shall be as given in Table 1 and shall conform to IS 5165.

6.4 Dimensions

Recommended dimensions with tolerances for guidance in fabrication are given in Table 1.

7 PACKING AND MARKING

7.1 Packing

Extractors shall be packed as agreed to between the purchaser and the supplier.

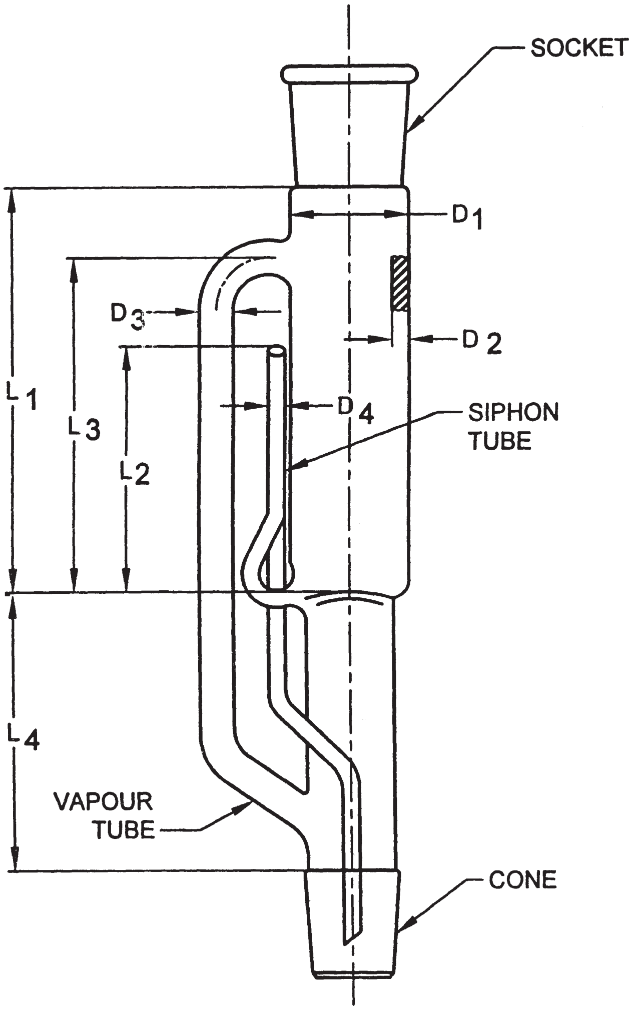
7.2 Marking

Extractors shall be permanently marked with the following:

a) Designation of the extractor;
b) Designation of the cone and socket, in accordance with IS 5165;
c) Manufacturers' name or his recognized trade-mark, if any; and
d) Serial number or lot number to enable the batch of manufacture to be traced from records.

7.2.1 *BIS Certification Marking*

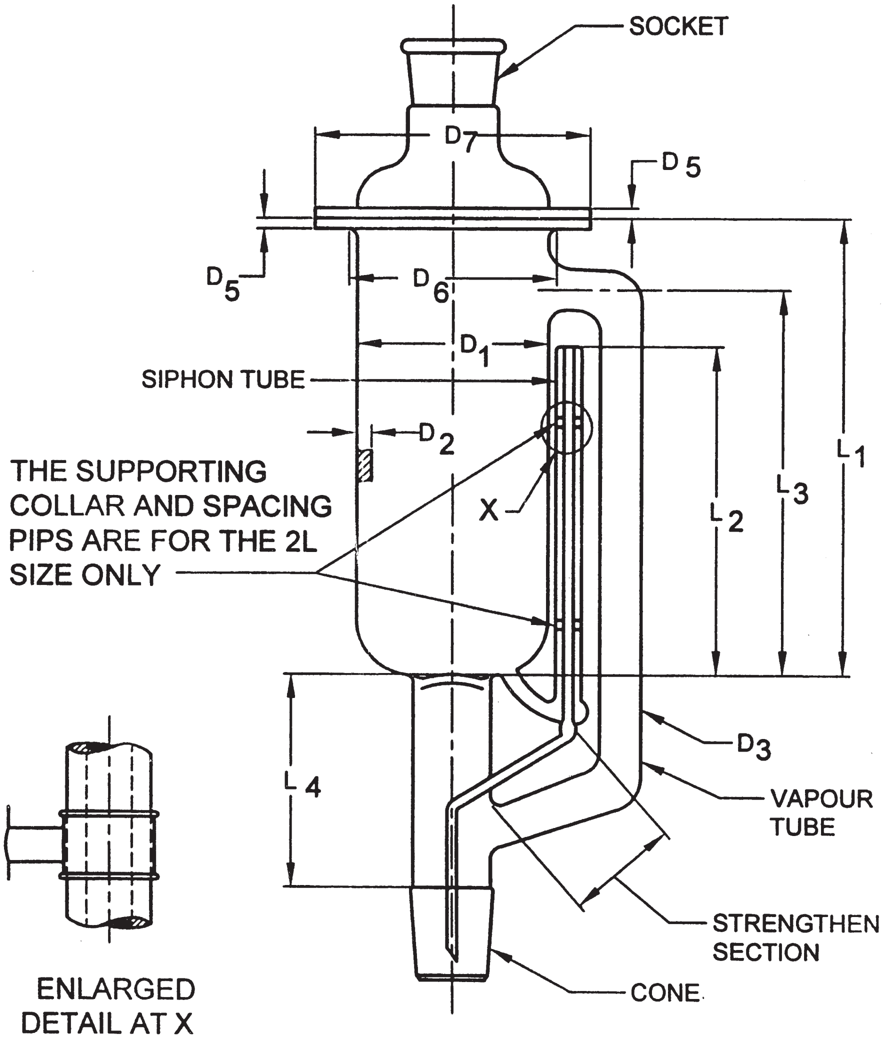
The extractors may also be marked with the Standard Mark.



D_1 = external diameter of the body
D_2 = wall thickness of the body
D_3 = external diameter of the vapour tube
D_4 = external diameter of the siphon tube

L_1 = length from bottom of the body
L_2 = length of siphon tube from bottom of the body
L_3 = length of vapour tube from bottom of the body
L_4 = length of lower appendage from bottom of the body, excluding cone

FIG. 1 SOXHLET EXTRACTORS PATTERN 'A'



D_1 = external diameter of the body
D_2 = wall thickness of the body
D_3 = external diameter of the vapour tube
D_4 = external diameter of the siphon tube
D_5 = minimum thickness of the flange
D_6 = nominal internal diameter at face of flange
D_7 = external diameter of flange

L_1 = length from bottom of the body
L_2 = length of siphone tube from bottom of the body
L_3 = length of vapour tube from bottom of the body
L_4 = length of lower appendage from bottom of the body, excluding cone

FIG. 2 SOXHLET EXTRACTORS PATTERN 'B'

7.2.1.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

8 SAMPLING

The method of drawing representative sample of extractors and the criteria for their conformity shall be as prescribed in IS 4426.

Table 1 Dimensions for Soxhlet Extractors

(*Clause* 6.4)

Sl No.	Component of Extractor	Nominal Capacities					
		60	100	200	500[1]	1 000[1]	2 000[1]
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Size of joint: Socket	34/35	40/38	50/42	34/35	34/35	34/35
ii)	Size of joint: Cone	24/29	24/29	24/29	34/35	34/35	34/35
iii)	Body:						
	a) External diameter, D_1 (mm)	38	45	55	80	110	110
	b) Wall thickness, D_2 (mm)	2	2.3	2.5	2.5	4.8	4.8
	c) Length from bottom of the body (excluding socket), L_1 (mm)	145 ± 10	170 ± 10	220 ± 10	240 ± 10	280 ± 10	390 ± 10
iv)	Siphon tube:						
	a) External diameter, D_4 (mm)	5	5	5	6	6	6
	b) Wall thickness (mm)	0.8	0.8	1.0	1.0	1.0	1.0
	c) Length from bottom of the body, L_2 (mm)	95 ± 2	110 ± 2	125 ± 2	125 ± 2	140 ± 2	270 ± 2
v)	Vapour tube :						
	a) External diameter, D_3 (mm)	10	10	10	15	18	18
	b) Wall thickness (mm)	1.0	1.0	1.0	1.2	1.2	1.2
	c) Length from bottom of the body, L_3 (mm)	110 ± 10	125 ± 10	158 ± 10	165 ± 10	180 ± 10	310 ± 10
vi)	Lower appendage:						
	Length from bottom of body, excluding cone, L_4 (mm)	81 ± 5	91 ± 5	100 ± 5	110 ± 5	120 ± 5	130 ± 5
vii)	Minimum thickness of flange, D_5 (mm)	—	—	—	5	6	6
viii)	Nominal internal diameter, D_6 (mm)	—	—	—	75	100	100
ix)	External diameter of flange, D_7 (mm)	—	—	—	100	125	125

NOTE — The recommended dimensions for the flasks and thimbles corresponding to the nominal capacities of soxhlet extractors are:

a) Capacity of flask (ml)	150	250	500	1 000	2 000	5000
b) Size of thimble, Dia × Height (mm)	28 × 80	33 × 118	43 × 123	60 × 180	—	—

[1] Flange type Soxhlet extractors.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Glass, Glassware and Laboratoryware Sectional Committee, CHD 10

Organization	*Representative(s)*
National Physical Laboratory, New Delhi	Dr A. K. Agrawal (***Chairman***)
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